

Connections Between Forestry and Weather

For the Soil & Water Conservation Districts Training Series
April 28, 2021

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Forestry Connections with Weather



- Fire (planned and un-planned)
- Nursery & Tree Planting
- Insects / Disease
- Timber Harvest
- Recreation



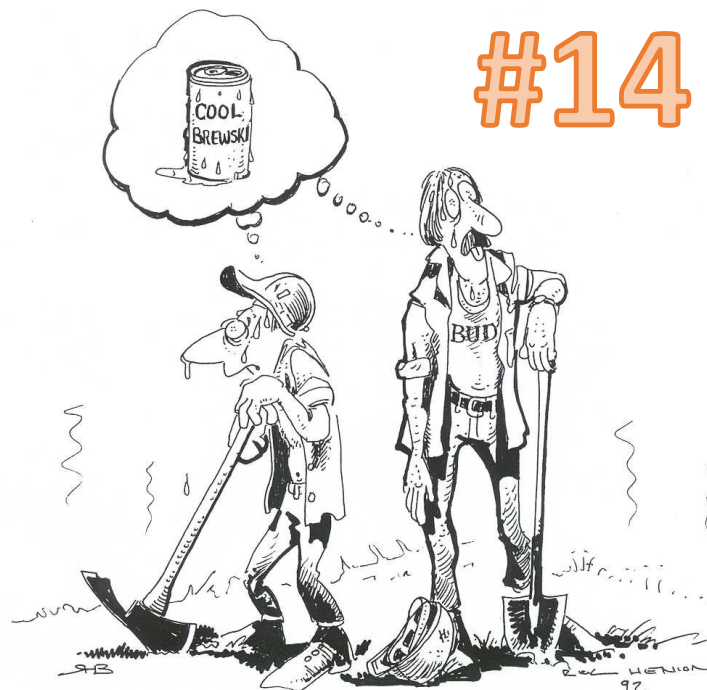
Fire Safety, 18 'Watch Outs'

#4



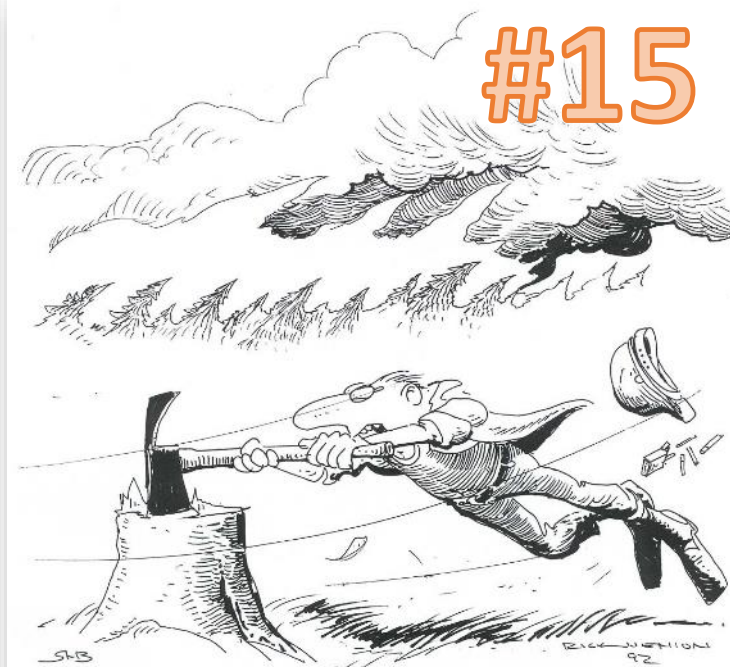
4. UNFAMILIAR WITH WEATHER AND LOCAL FACTORS INFLUENCING FIRE BEHAVIOR

#14



14. WEATHER IS GETTING HOTTER AND DRIER

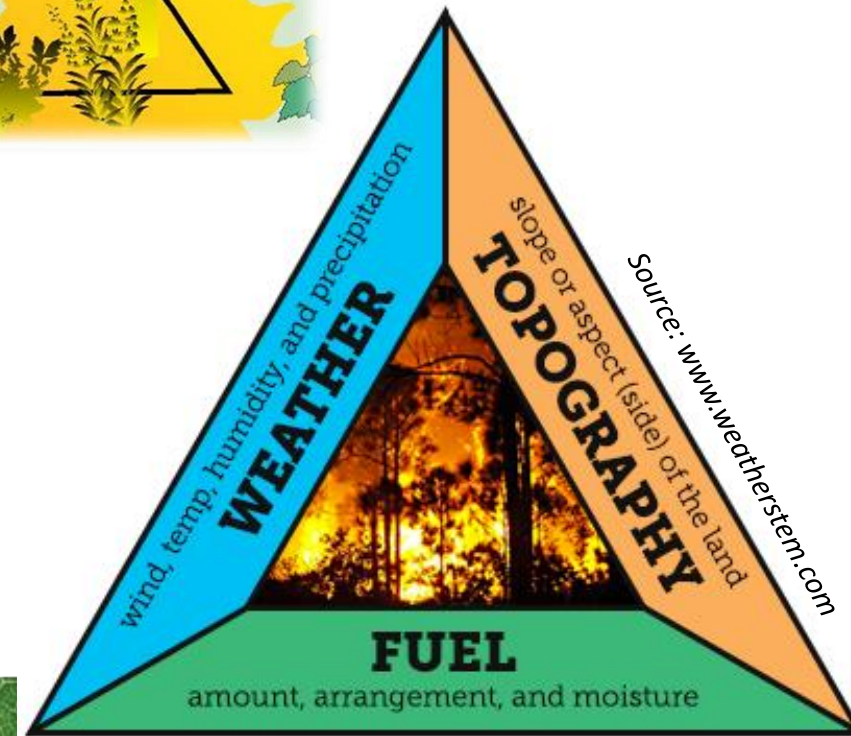
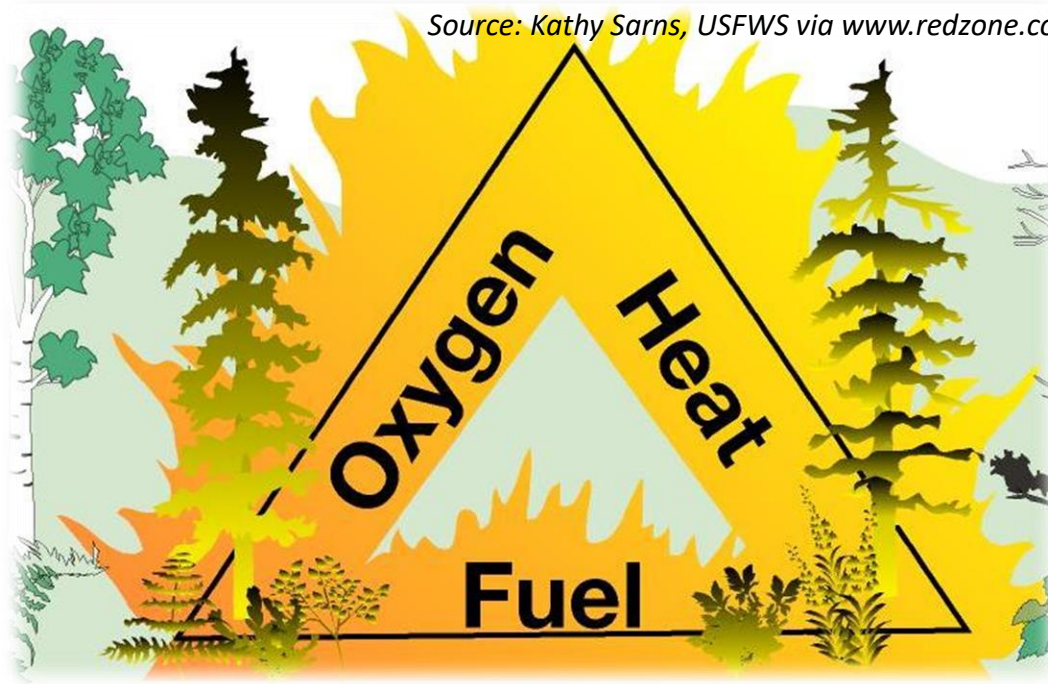
#15



15. WIND INCREASES AND/OR CHANGES DIRECTION

Fire Weather (Factors)

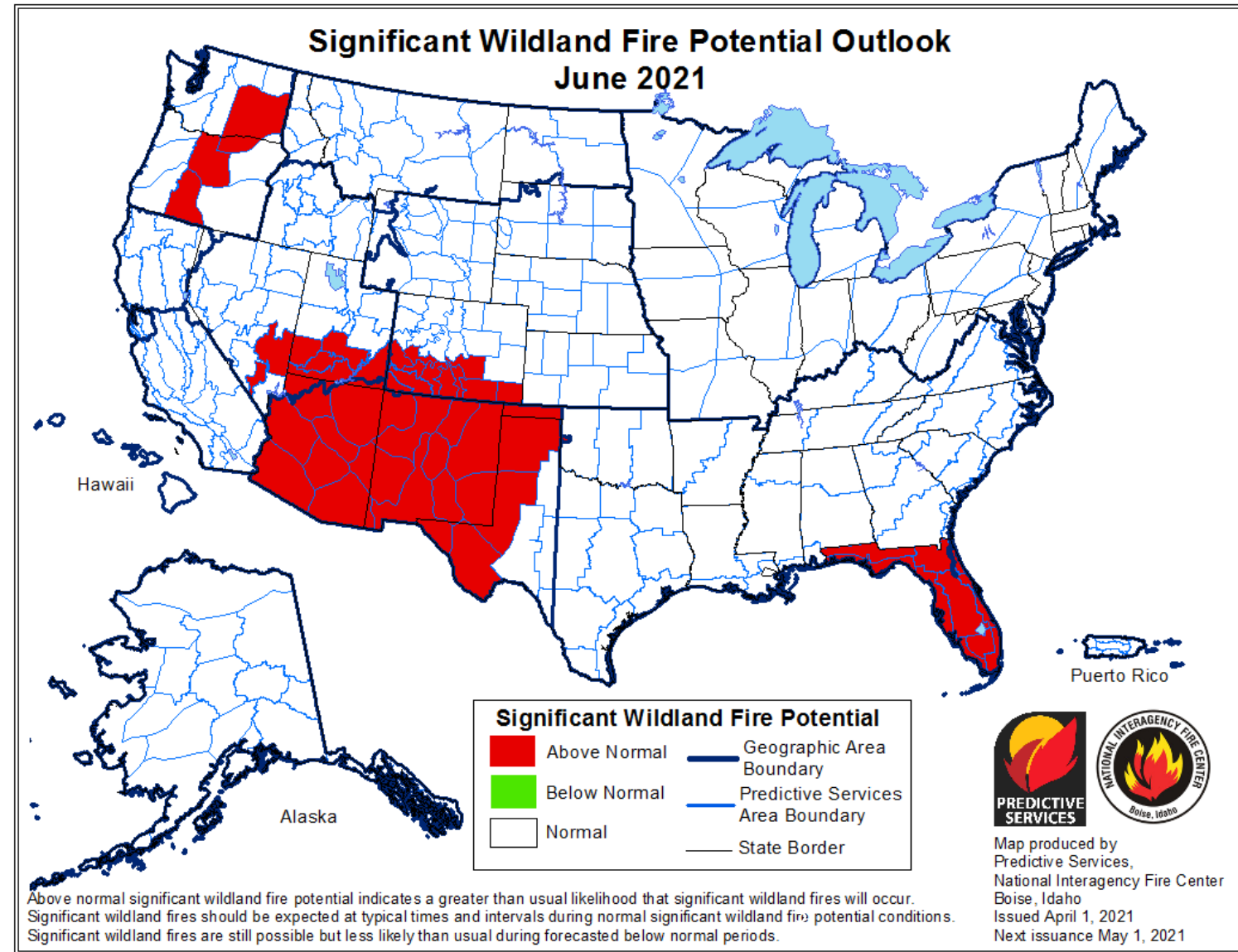
1. Relative Humidity
2. Air Temperature
3. Wind
4. Fuel Moisture Content (Precipitation)
5. Atmospheric Dispersion



Fire Behavior Triangle

Fire Weather (Scale)

1. Overall weather pattern
2. Localized weather
3. Micro-site fire-induced weather





Quick Links

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[NCFS - Home](#) >> [Fire Control & Prevention](#) >> Fire Environment

Fire Environment

Fire Environment Committee

The Fire Environment Committee (FEC) is an integrated, programmatic approach to provide guidance in Fire Danger, Weather, RAWs Network Management, Smoke Management, Fire Use, Effects, Behavior and Research. The Committee also continues to develop an active association with the Southern High Resolution Modeling Consortium, NC Division of Air Quality, the Region's Geographic Coordination Center Predictive Services Group, and the National Weather Service. The commonality of all these groups is that they are focused on some aspect of the "fire environment" by measuring, predicting and/or providing guidance for decisions made for natural resource management.

[Fire Environment Committee Charter](#)

Fire Weather

[Intelligence Portal](#)[Fire Weather Reports](#)[Fire Weather Tools \(PDF\)](#)

Fire Danger

[Regional Fire Danger
Assessment](#)[Daily District Readiness Plans](#)[Fire Danger Tools \(PDF\)](#)[National Fire Danger Rating
System](#)[Keetch-Byram Drought Index
\(KBDI\)](#)[Fire Danger Rating Pocket Cards](#)[Fire Danger Tech Notes](#)

Smoke Management

[North Carolina Smoke
Management Program](#) (updated

Fire Weather -- Factors



1. Relative Humidity (RH)

- Low RH ----> Drier air ----> fuels more receptive to ignite
- “Recovery”: Overnight the RH usually goes up, less chance of re-burn
- Daily & Local Influences: clouds, sun, landcover veg (evapotranspiration)

2. Air Temperature

- Higher temps ----> fuels pre-heated ----> more receptive to burning
- Also higher temps likely lead to greater damage to trees from fire
- *(Hot temps also impact the people and equipment working the fire)*



Fire Weather -- Factors



3. Winds

- Multiple influences on fire behavior
- Pushes fire & smoke direction... + adds oxygen into the fire
- Speed and Direction of winds (SW wind = warm & dry)
- Surface Winds -VS- High Altitude Winds (smoke management)
- Local/Daily Winds (sea-breeze... mountain slopes)
- Frontal boundaries & Thunderstorm influence (outflows... gusty wind)



Fire Weather -- Factors



4. Fuel Moisture Content (Precipitation)

- Less precip ----> drier fuels, more receptive to ignition and burning
- Drought condition is just 1 factor to monitor for wildfire potential
- Precip duration is more impactful than quantity, for larger-sized fuel

1 hour fuels, less than ¼" diameter (dried grass, needles, leaves)

10 hour fuels, ¼" to 1" (twigs)

100 hour fuels, 1" to 3" (limbs, branches)

1000 hour fuels, 3" to 8+" (logs, stumps)



Fire Weather -- Factors



5. Atmospheric Dispersion (Air Inversions)

- Occurs when layer of warmer air is higher above cooler air
- Prevents hot air exhaust & smoke from rising, trapping it near surface
- Important for managing / minimizing impacts from smoke
- Lingering smoke ----> health concerns, reduced visibility
- Smoke mixes with fog ----> white-out / blinding conditions



Fire Weather -- Scale



1. Overall Patterns

- Daily NWS and media forecasts
- La Nina / El Nino
- Long term drought situation (+ flash drought!)



Helpful to keep situation in overall context, long range planning.

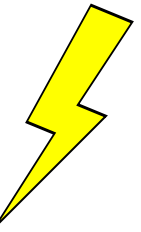
2. Localized Weather

Coast: sea breeze

Mountains: diurnal slope winds

Thunderstorms: outflow boundaries/downdrafts, lightning*

*Most Frequently Monitored Scale
for Impacts "on the Fireline"*



**Lightning causes
<5% of wildfires, but
can result in large,
prolonged fires.*



Fire Weather -- Scale



Jim-Gem® Fire Weather Instrument Kit

★★★★★ 1 customer review

Availability: **In Stock**

Stock Number: 89088

Quantity	Price
1+	\$132.50
5+	\$114.20

Earn 133 Reward Points with this Purchase.

Quantity: [Add To Cart](#)

[Add To My Equipment List](#)

Description Specifications Reviews (1) Q&A (1)

Jim-Gem Fire Weather Instrument Kit
Includes wind meter that measures up to 60 mph, d
(Azimuth) for wind direction and fire location, sling
slide rule for wet and dry bulb temperature (30°F to
100 page notebook for recording data, mechanical
case.

*Shown just for example purposes:
There are other portable weather
kits from other suppliers.*



PRODUCTS ▾

APPLICATIONS ▾

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SUPPORT

🏠 > Kestrel 3550FW Fire Weather Meter



Kestrel 3550FW Fire Weather Meter

★★★★★ 2 Reviews

The newest and most affordable fire weather meter is now more c
features and comprehensive weather monitoring capabilities of the
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Fire Weather -- Scale



3. Micro-Site, Fire-Induced Weather

- [rare] Pyrocumulus clouds https://www.weather.gov/AMA/may11_2018
- [rare] Fire whorls ('firenados')
- Erratic winds....especially upslope or through draws/hollows/valleys

Key to Successful Use of Prescribed Fire is Planning and Taking Advantage of Suitable Conditions.



Fire Weather Intelligence Portal

A product of the State Climate Office of North Carolina

Past Conditions

Current Conditions

Displaying RAWS Fuel Moisture

Forecast Conditions

Map Details

- ☒ Use my current location and zoom level
- [Detect my location](#)
- ☐ Zoom to a state
- ☐ Zoom to a county
- Map Background: ☒ Terrain map ☐ Street map
- ☐ County lines
- ☐ River basins
- ☐ NC Forest Service regions
- ☐ NC Forest Service districts
- ☐ NC Fire Danger Rating Areas

Observation Time

► Most recent observations are from today (Apr 14) at 1 pm

The next observation will be available at 2:15 pm

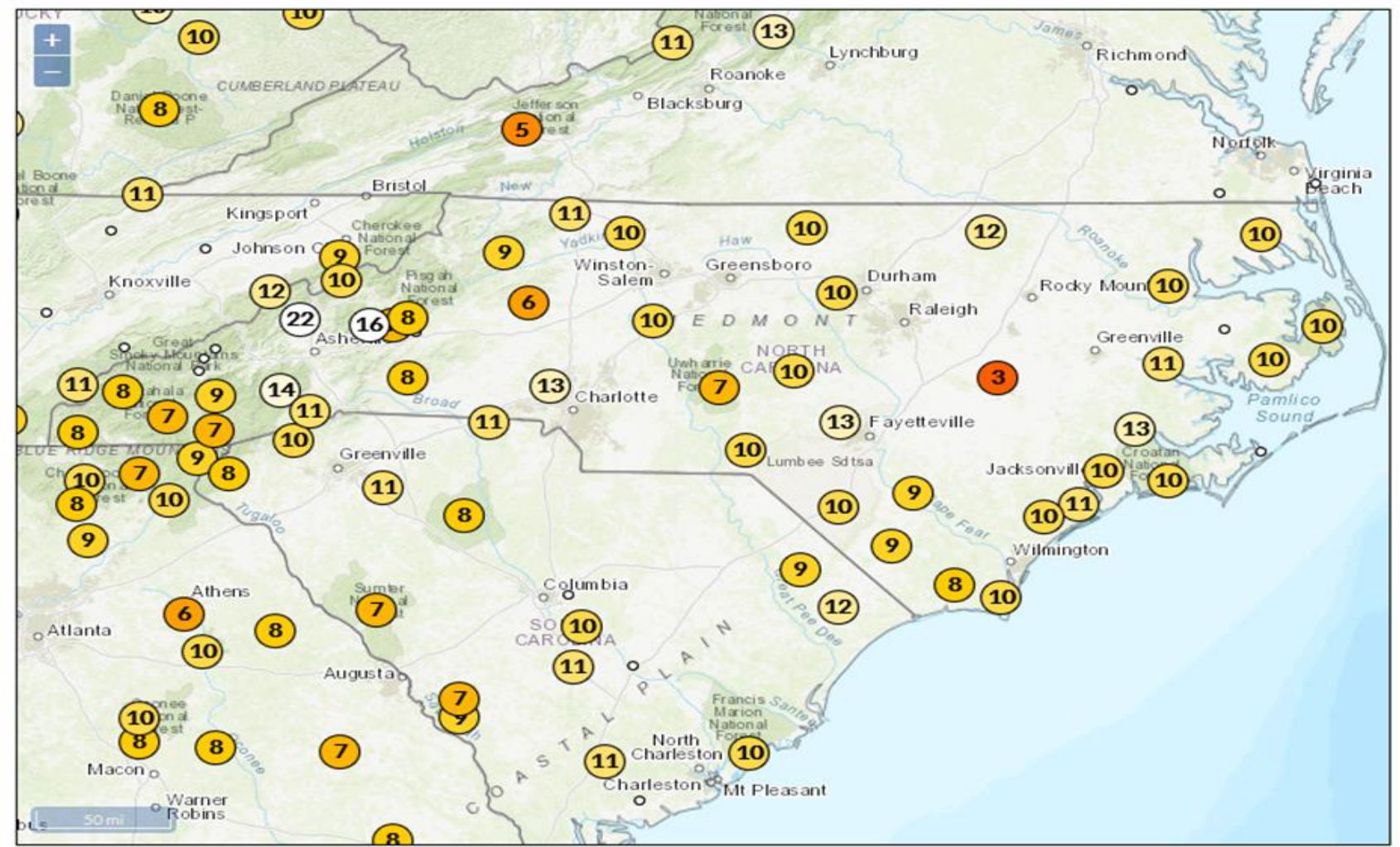
Point Data

- ☒ Show one parameter
- ☐ Show four parameters
- RAWS Fuel Moisture
- Update Point Data
- Weather Station Networks:
- ☒ RAWS
- ☒ NC ECONet
- ☒ ASOS
- ☒ AWOS
- ☒ NC Organic Soil

Gridded Data

- Dataset:

Select a parameter
- Update Gridded Data



<https://legacy.climate.ncsu.edu/fwip//>






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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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Local forecast by "City, St" or ZIP code

[Location Help](#)

Thunderstorms and Flooding Along the Gulf Coast; Winter Returns in the Central Rockies

A stalled front along the west-central Gulf Coast will contribute to a few severe thunderstorms and heavy rain with flooding over the next couple of days. Meanwhile, a vigorous system will produce heavy snow across the central Rockies into the High Plains the next few days. Finally, critical fire weather conditions are expected across the Four Corners region through Thursday. [Read More >](#)



https://www.predictiveservices.nifc.gov/fuels_fire-danger/fuels_fire-danger.htm

Fire Weather

[Weather.gov](#) > Fire Weather

Fire Weather

National Program

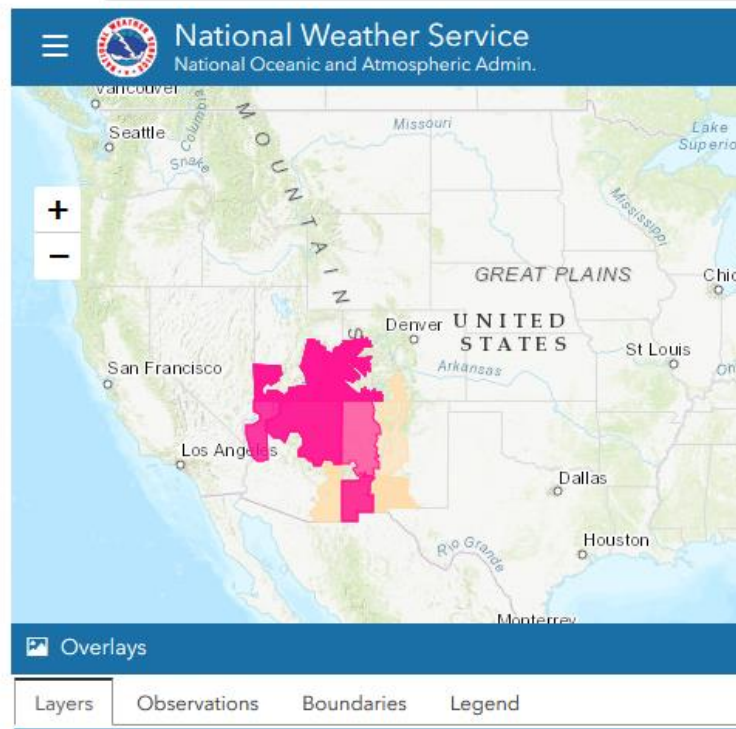
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Hazard/Overview Map

NWS Fire Wx Forecast Map

Today's SPC Outlook

Latest



Mobilizing Incident Resources Throughout the United States

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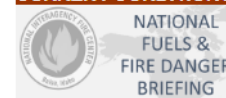
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FUELS AND FIRE DANGER

CURRENT CONDITIONS



[Fuels & Fire Danger Briefing](#)

Predictive Service Areas Fire Danger Charts

Page Under Construction



[National Fire Danger Rating System \(NFDRS\)](#)
[Wildland Fire Assessment System \(WFAS\)](#)

Fuels and Fire Behavior Advisories

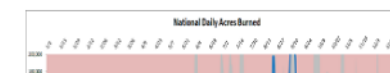
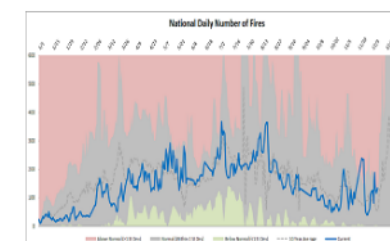
Current Fuels and Fire Behavior Advisories

There are currently no advisories in effect.

[Fuels and Fire Behavior Advisory Template \(PDF\)](#) (Word Document)
[Fuels and Fire Behavior Advisory Protocols](#)

Fire Occurrence

Weekly Year-to-Date Numbers of Fires and Acres Burned



Seedling Nursery & Tree Planting

NCFS grows millions of seedlings annually for sale, to re-stock forests.

Seedling production and development is influenced by weather.

Nursery operations and tree planting have direct connections to weather.



Nursery Operations

- Literally is “tree farming”
- Soil conditions: too wet,...too dry
- Managing irrigation
- In-field tractor work
- Fungal growth when too wet
- Frozen soil at mountain nursery
- Tornadoes...Hail...Ice...Floods ----->



Forest Seedling Nursery



Pines

- Tree breeding programs have evolved to collect the pollen from 1 family of trees, and deposit it onto the flowers of another family of trees
- Timing of pollen production, collection and application
- Timing of cone & flower formation



Hardwoods

- Seed is collected from wild
- Weather influences a tree's ability to produce fruit/nut/seed
- Heavy years, light years
- Many species' seed cannot be stored long-term, so seedling availability can vary year-to-year



Seed Stratification

- Exposing seed to proper environmental conditions to break its dormancy and initiate germination.
- Nursery must simulate the required conditions, by species.
- Cold Exposure...or Warm/Moist Exposure... (and/or scarification of seedcoat)



Forest Seedling Nursery



Bareroot Tree Seedlings

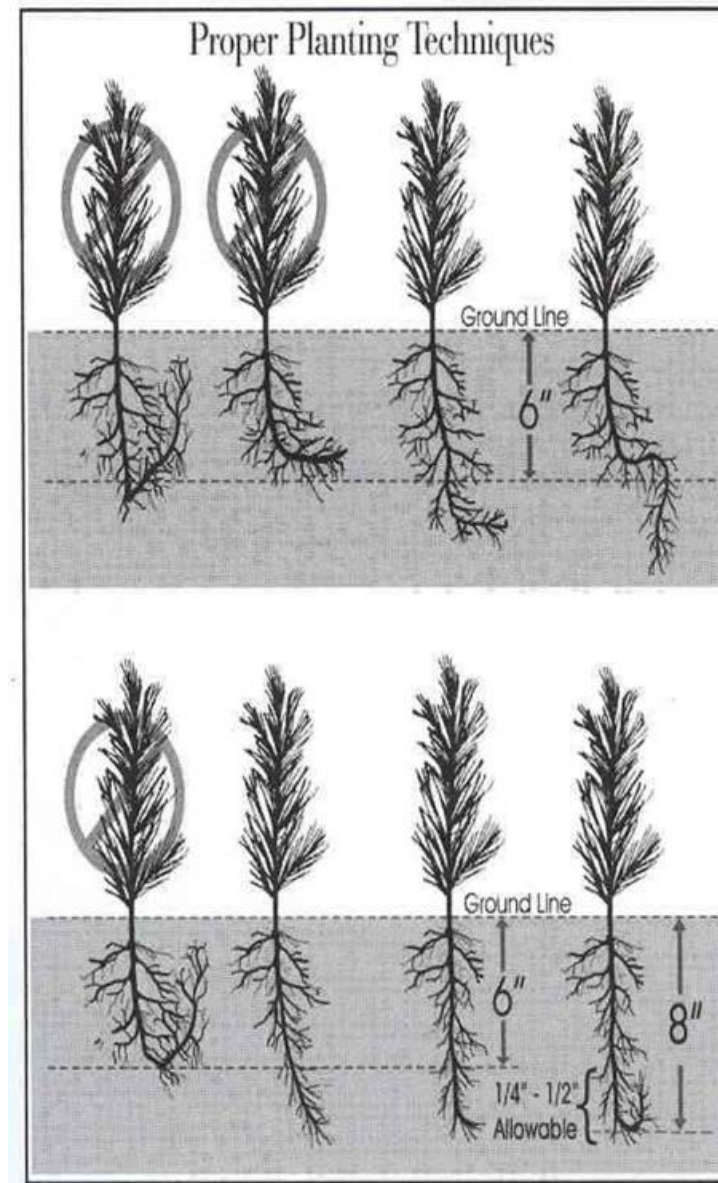
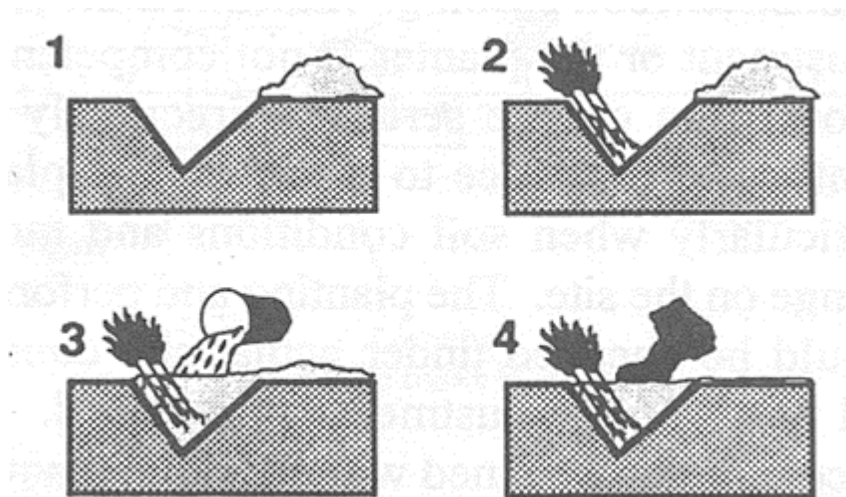
- Grown in soil
- Exposed to elements (irrigation is used)
- Extreme cold will kill seedling in the bed.
- Before seedlings can be lifted from the soil & packed/shipped to customer, they must 'harden off' = enter dormancy
- Dormancy is achieved after seedling is exposed to enough Chilling Hours:
 - cumulative # of hours, 32°F -- 46°F.
 - need 400 Chilling Hours to harden off
- Warm winter temps can accelerate bud-break while still in nursery...*not good*.



Forest Seedling Nursery



- Plant in winter, dormant season
- Can plant early for pine ('hot planting')
- Weather conditions before + during + after planting can influence survival
 - Frozen soil...too wet...too dry.
- Seedling storage outside of a refrigerated cooler: RH, temps, sun, wind



Tree Planting



CLASSIFICATIONS OF WEATHER CONDITIONS FOR TREE PLANTING

Each NCFS District Office will broadcast a predicted tree planting category “day” based on predicted weather conditions at 1300. Three categories are listed below.

Satisfactory Day

Air temperature:	33°F to 75°F
Relative humidity:	50% +
Winds less than:	10 mph
Soil moisture:	Moist to touch

Marginal Day

Air temperature:	76°F to 85°F
Relative humidity:	30% to 50%
Winds less than:	10 to 15 mph
Soil moisture:	Upper 1-inch dry

Severe Day

Air temperature:	32°F or below, or 85°F+
Relative humidity:	30% or less
Winds less than:	15 mph or stronger
Soil moisture:	Upper 3-inches dry, or ground is frozen

NCFS Tree Planting Specifications



The term “chilling hours” refers to the number of hours seedlings are exposed to temperatures between 32°F and 46°F in the field. Chilling hours are recorded and can be obtained from the nursery. Once the seedlings have received more than 400 chilling hours they can be lifted for extended storage. Before that time, storage time for non-dormant seedlings should be limited. In cases where early planting of non-dormant seedlings is requested, we suggest all seedlings be stored at temperatures set to no more than 50°F. Maximum storage times must follow these guidelines:

Chilling Hours	Planting Guidelines
0-200	24 hr. refrigeration, plant immediately
201-350	2 weeks refrigeration, plant immediately
351-400	3 weeks refrigeration, plant immediately

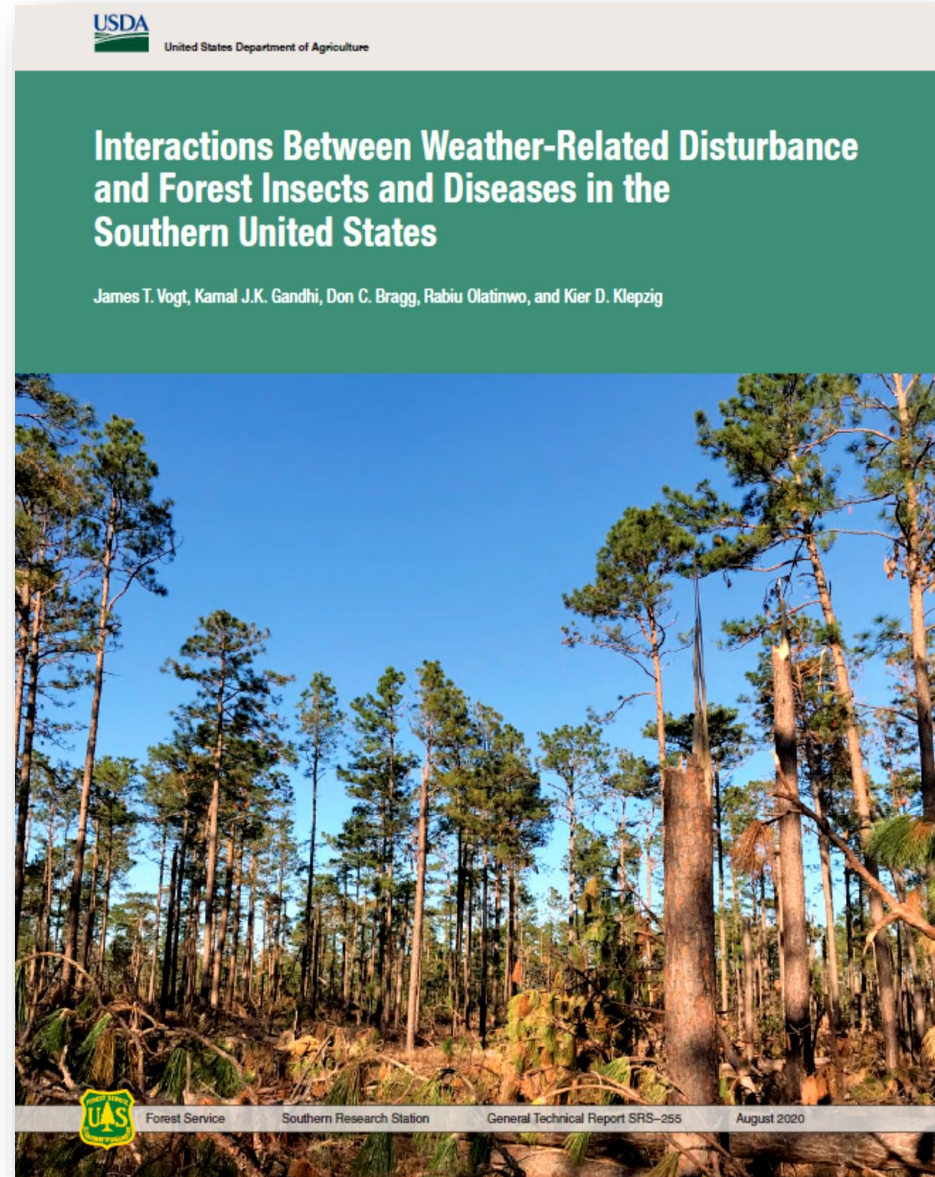
NOTE: Planting of non-dormant seedlings should not occur during SEVERE conditions.

Insects & Disease

Multi-variable influences.

Long Term & Short Term.

Weather and climate often compound or worsen pre-existing stressors, making tree/forest more susceptible.



August 2020, USFS General Technical Report SRS-255.

<https://www.fs.usda.gov/treearch/pubs/60817>



August 2020, USFS General Technical Report SRS-255.

<https://www.fs.usda.gov/treearch/pubs/60817>

Weather/ abiotic event	Insect or pathogen	Observation	Host tree	Years reported
Drought	Actinopelte leaf spot (<i>Actinopelte dryina</i>)	Premature defoliation associated with drought	Oak (<i>Quercus</i> spp.)	1985, 1986
Drought	Heterobasidion (annosum) root disease (<i>Heterobasidion irregulare</i>)	Disease exacerbated by drought	Southern pines (<i>Pinus</i> spp.)	2004
Drought	Heterobasidion (annosum) root disease	Decline in disease due to relief from drought	Southern pines	2003
Drought	Balsam woolly adelgid (<i>Adelges piceae</i>)	Increased attacks and tree mortality	Fraser fir (<i>Abies fraseri</i>)	1986
Drought	Black turpentine beetle (<i>Dendroctonus terebrans</i>)	Increased insect activity	Southern pines	1963, 1968
Drought	Black turpentine beetle	Increased attacks and tree mortality	Southern pines	1969, 1971, 1981, 1982, 1983, 1985, 1986, 1987, 1988, 2000, 2001, 2002, 2003, 2005, 2006
Drought	Charcoal root rot (<i>Macrophomina phaseolina</i>)	Disease intensified as a result of extended drought	Loblolly pine (<i>Pinus taeda</i>)	1987
Drought	Cytospora canker (<i>Cytospora</i> spp.)	Aggravated by drought	Cottonwood (<i>Populus</i> spp.)	1987
Drought	Decay fungus (<i>Meruliopsis taxicola</i>)	Drought allowed fungus to cause significant decay	Cypress (<i>Taxodium</i> spp.)	2003
Drought	Dutch elm disease (<i>Ophiostoma novo-ulmi</i>)	Increased attacks and tree mortality	American elm (<i>Ulmus americana</i>)	1998
Drought	European elm bark beetle (<i>Scolytus multistriatus</i>)	Reduced tree vigor, beetle readily established broods in weakened trees	American elm	1955



August 2020, USFS General Technical Report SRS-255.
<https://www.fs.usda.gov/treearch/pubs/60817>

Flooding	Bald cypress leafroller (<i>Archips goyerana</i>)	Increased mortality	Baldcypress (<i>Taxodium distichum</i>)	1998, 1999, 2001, 2002
Flooding	Black turpentine beetle	Stands attacked	Southern pines	1957
Flooding	Black turpentine beetle	Increased attacks and tree mortality	Southern pines	1966, 1969, 1973, 2003, 2004
Flooding	Buck moth (<i>Hemileuca maia</i>)	Increased defoliation	Live oak (<i>Quercus virginiana</i>), other hardwoods	2005
Flooding	Gouty oak gall (<i>Callirhytis quercuspunctata</i>)	Increased mortality	Willow oak (<i>Quercus phellos</i>)	2003
Flooding	Longhorned beetle (<i>Lagocheirus aranaeformis stroheckeri</i>)	Increased attacks and tree mortality	Gumbo limbo (<i>Bursera simaruba</i>)	2006
Flooding	Pine engraver beetles	Increased attacks and tree mortality	Shortleaf pine	1973
Flooding	Red oak borer (<i>Enaphalodes rufulus</i>)	Increased attacks and tree mortality	Oak	2002
Frost	Elm spanworm (<i>Ennomos subsignaria</i>)	Insect decline	American elm	1963
Frost	Fall cankerworm (<i>Alsophila pometaria</i>)	Insect decline	—	1961
Frost	Gypsy moth	Population of gypsy moth declined	—	2002
Frost	Slime flux (<i>Erwinia</i> spp.)	Associated with frost cracks	Oak	1984, 1985
Frost	Stem cankers (<i>Cytospora</i> spp., <i>Sphaeropsis</i> spp., <i>Phoma</i> spp., <i>Fusarium solani</i>)	Disease exacerbated by late frost	Black cherry (<i>Prunus serotina</i>), oaks	1984
Frost	Virginia pine sawfly (<i>Neodiprion pratti pratti</i>)	Insect outbreak declined due to frost	Southern pines	1966
Frost	Yellow-poplar weevil (<i>Odontopus calceatus</i>)	Frost may affect weevil survival	Yellow-poplar (<i>Liriodendron tulipifera</i>)	1986



August 2020, USFS General Technical Report SRS-255.

<https://www.fs.usda.gov/treearch/pubs/60817>

Wind	Ambrosia beetle (<i>Xyleborus</i> spp.)	Increased attacks and mortality	Pines, hardwoods	1990, 1991, 1992
Wind	Black turpentine beetle	Increased attacks and mortality	Southern pines	1969, 2005, 2006
Wind	Coal fungus (<i>Ustulina vulgaris</i>)	Windthrow of diseased trees	Sugarberry (<i>Celtis laevigata</i>)	1973
Wind	Fusiform rust (<i>Cronartium quercuum</i> f. sp. <i>fusiforme</i>)	Tree mortality increased from wind and disease	Slash pine (<i>Pinus elliottii</i>)	2012
Wind	Maple petiole borer (<i>Caulocampus acericaulis</i>)	Resulted in premature defoliation	Sugar maple (<i>Acer saccharum</i>)	1985
Wind	Pine engraver beetles	Insect increased as a result from wind damage	Southern pines	1961
Wind	Pine engraver beetles	Increased attacks and tree mortality	Southern pines	1961, 1967, 1969, 1970, 1975, 1983, 1990, 1993, 1996, 2004, 2006
Wind	Pitch canker (<i>Fusarium moniliforme</i> var. <i>subglutinans</i>)	Greatest damage in orchards previously damaged by wind	Virginia, slash, shortleaf, longleaf (<i>Pinus palustris</i>), white, and Scots (<i>Pinus sylvestris</i>) pine	1980
Wind	Red oak borer (<i>Enaphalodes rufulus</i>)	Increased attacks and tree mortality	Black oak, red oaks	2006
Wind	Slime flux	Severe on previously storm-damaged trees	Hickory, oak	1987, 1988, 1989, 1991
Wind	Southern pine beetle	Increased attacks and tree mortality	Southern pines	1990, 1997
Wind	Stem decay (Basidiomycetes)	Problematic in wind-damaged stands	Hardwoods	1986, 1988, 1989, 1990, 1991, 1992



U.S. FOREST SERVICE
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United States Department of Agriculture

CLIMATE CHANGE RESOURCE CENTER



EDUCATION



TOPICS



ADAPTATION



TOOLS



LIBRARY

Bark Beetles and Climate Change in the United States

Preparers

Barbara Bentz, Rocky Mountain Research Station, Kier Klepzig, Southern Research Station

An archived version of this topic paper is available

Issues

Bark beetles that infest and reproduce in live trees are capable of causing landscape-wide tree mortality. In the United States (US), species in the genera *Dendroctonus* and *Ips* are the primary culprits. Between 1997 and 2010 more than 5 million hectares were affected by bark beetles in the western US, most notably mountain pine beetle (*D. ponderosae*), spruce beetle (*D. rufipennis*), and pin/for ips (*I. confusus*) (1), and the amount of carbon (C) in trees killed by these insects exceeds that of C in trees killed by fire (2). In the southeast and northeast US, southern pine beetle (*D. frontalis*) has affected more than 14,000 hectares since 2008, particularly in New Jersey and Mississippi. Prior to the activity during the late 2000s, expanding infestations of southern pine beetle had not been detected in the southeast or northeast since 2002 (3). It is clear that bark beetle outbreaks significantly influence forest ecosystem dynamics and carbon cycles, and research suggests warming summer and winter temperatures are major drivers of beetle population outbreaks across the US, and apparent range expansion in some species (4, 5, 6). Mountain pine beetle, spruce beetle and southern pine beetle are examples of bark beetles with the capacity for irruptive population growth. Populations exist at low levels for many years until triggered by factors such as drought (7, 8, 9), windfall (10), and pathogens that stress trees (11). Other species of bark beetles such as pin/for ips can be triggered by similar conditions, although their population dynamics are more directly tied to the condition of the host tree (12). Once a trigger occurs, population growth depends on the scale of the trigger, continued favorable conditions including suitable host trees throughout the landscape (13), and temperatures that favor winter beetle survival (14, 15) and successful tree attacks in the summer (16).

Related Topics

Northeastern US Forest Pests

Effects of Drought on Forests and Rangelands

Forest Tree Diseases and Climate Change

Invasive Plants in Forests and Rangelands

Insect Disturbance and Climate Change

Wildland Fire

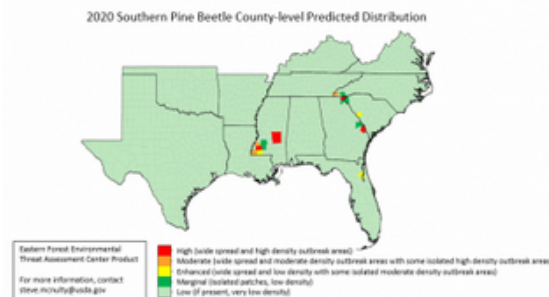
Air Pollution

Cumulative Effects and Climate Change

<https://www.fs.usda.gov/ccrc/topics/bark-beetles-and-climate-change-united-states>

Forecasting Short- and Long-Term Southern Pine Beetle Risk in the Southeastern US

Southern pine beetles (SPB) are destructive insect pests that cause tens- to hundreds-of-millions of dollars in economic losses annually in the southeastern US. SPB outbreaks usually start in stressed stands, but healthy trees become susceptible to attack and mortality as beetle populations grow. Large scale outbreaks can also last several years if not suppressed and have resulted in over a billion dollars in timber losses over the past several decades. Early SPB detection and treatment can help reduce the spread and impact. Forest land managers need better information to identify and prepare for SPB outbreaks so that they can focus their limited resources to quickly treat SPB population explosions.



To address this need, the [USDA Southeast Climate Hub \(SERCH\)](#) developed the [Southern Pine Beetle Outbreak Model version 1.0 \(SPBOM1\)](#). SPBOM1 forecasts SPB risk using a combination of; 1) the previous year's SPB spot (i.e., infestation) data; 2) the most recent [NOAA monthly weather forecasts for the southeastern US](#); 3) the most recent stand origin, species composition, and stand density data from the [USDA Forest Inventory and Analysis Program](#); and 4) [WaSSI hydrologic model](#) predictions of pine evapotranspiration (a measure of tree stress) to predict SPB outbreaks at a county level resolution. Validation of SPBOM with reserved (not used in model development) SPB spot data indicated that the model had an accuracy rate of 72% in predicting beetle outbreak areas using historic climate.

SPBOM1 was released in June 2019 to forecast the distribution and severity of SPBs, and alert forest managers to areas of high southern pine beetle risk. SPBOM will be used each spring to provide outbreak forecasts for the coming growing season (i.e., spring, summer, and fall). Each October SPBOM1 will be rerun with the current years observed SPB population data to help inform management planning for

<https://www.climatehubs.usda.gov/hubs/southeast/topic/forecasting-short-and-long-term-southern-pine-beetle-risk-southeastern-us>

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64% of U.S. companies plan to implement SD-WAN in the next year



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Science News

from research organizations

Cool weather can amplify attacks of tree-killing bark beetle

Date: May 31, 2018

Source: Dartmouth College

Summary: New research looks at how the destructive southern pine beetle reacts to cooler weather in its climate-induced, new northern ranges.

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RELATED TOPICS

- Plants & Animals
- > Trees
 - > Insects (including Butterflies)
 - > Nature
 - > Invasive Species
- Earth & Climate
- > Weather
 - > Forest

FULL STORY

As a warming climate invites the destructive southern pine beetle to expand its northern range, the cooler weather in this new habitat can potentially increase the lethality of the insect's assault on trees, according to a new study from Dartmouth College.

The research demonstrates how climate change can create a destructive, one-two punch for forests that are already under attack, and another mechanism by which weather can influence the abundance of insect pests.

In the study, the Dartmouth research team shows how the colder


Cisco
Umbrella

64% of U.S. companies plan to implement SD-WAN in the next year





<https://www.sciencedaily.com/releases/2018/05/180531131129.htm>



https://www.ncforestservice.gov/forest_health/forest_health_notes.htm

[NCFS-Home](#) >> [Forest Health](#) >> Forest Health Notes

Forest Health Notes

Forest Health Notes are produced periodically to highlight important and/or emerging forest pests of interest to our personnel, our cooperators, and the public.

All issues are in Adobe's [Portable Document Format](#) (PDF).

- [January 2021 - 2020 Forest Health Highlights: The state of the health of state and private forests in North Carolina](#)
- [October 2020 - 2020-2021 Gypsy Moth Program Update](#)
- [June 2020- Pest Watch: Asian Longhorned Beetle Found in Neighboring State](#)
- [November 2019 - 2019-2020 Gypsy Moth Program Update](#)
- [September 2019 - Impacts of Hurricane Dorian on Forest Trees in Eastern North Carolina](#)
- [August 2019 - Hurricane Florence Aftermath: Water Stress, Drought, and Mortality in Forest Trees in Eastern North Carolina](#)

Quick Links

[My Woodland Plan](#)

[Burning Permits](#)

[COVID-19 Information](#)

[Dupont State Recreational Forest](#)

[Order Tree Seedlings](#)

[Situation Report](#)

[Fire Weather](#)

[Readiness Plans](#)

[Educational State Forests](#)

[N.C. Firewise](#)

[Strategic Plan](#)

[Forest Action Plan](#)

[2017 Biennial Report](#)

Timber Harvesting & Forest Chemical Use



- ‘Loggability’ often driven by soil & terrain (site drainage)
- Some tracts require dry conditions; others can handle rains
- Planning & Scheduling can help, but...must adapt on-the-fly
- Timber sale contracts often include weather-related time extension
- Salvaging damaged timber from wind/ice/snow storm



Market Effects:



- Prolonged wet ----> scarcity of timber for mills ----> higher prices for landowners
- Prolonged dry ----> excess timber supply ----> lower prices & 'mill quota' limits
- Extreme wet or dry: additional wear & tear on logger's equipment (and people...)



Timber Harvest 33



BMP Needs



- Core mission: water quality protection, E&SC measures
- Account for precip events: normal (& 'new-normal'): "*Wet Weather Logging Advisory*"
- As weather patterns seem to become more variable (intensity, seasonality)...adjustments are warranted. The old standard degree of BMP usage may need to be ramped-up.



Timber Harvest

Herbicide (and Fertilization)

- Precipitation: wash away, runoff
- Hot air temp: volatilization
- Winds: avoid off-target drift
- Ground application: good soil conditions for operability
- Aerial application: good flying conditions



Forest Chemical Use



Recreation

Nice Weather =
More People Outdoors

Maintenance & Upkeep

Storm Impacts



Nice Weather = More People Outdoors

- High-Use areas get 'loved to death'
- More Use = more litter... more maintenance... more patrol



Recreation



Maintenance & Upkeep



- Nice weather is best for maintenance...also more people likely to be in the forest



Road/Crossing Renovation...

Trail Upkeep...

Prescribed Burning...



Recreation

Storm Impacts

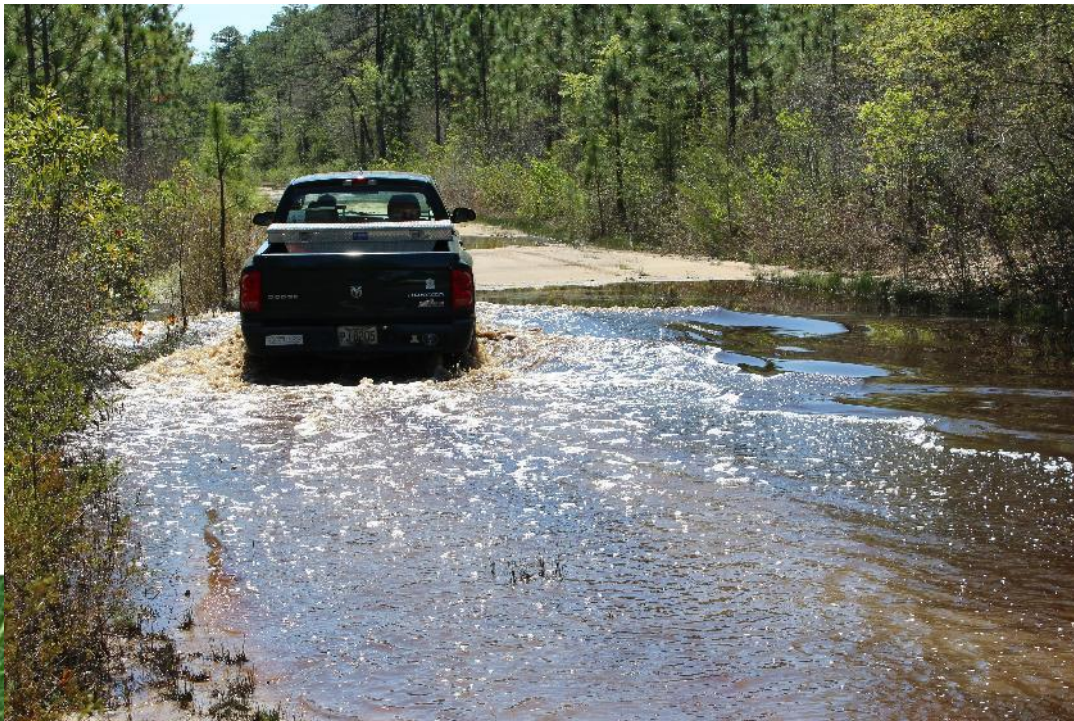


AREA CLOSED

High Water Level

Follow Detours

Inquire with Forest Office for updates.



CAUTION

High Water Level



Some trails may be underwater,
muddy or slick.



**Proceed with care.
Follow detours where posted.**

Inquire with Forest Office for updates.

Recreation



RAWS: *Remote Automated Weather Stations*

<https://raws.dri.edu/>

*Hourly + Daily + Monthly + Yearly
Precip, Wind, RH, Temp., etc.*

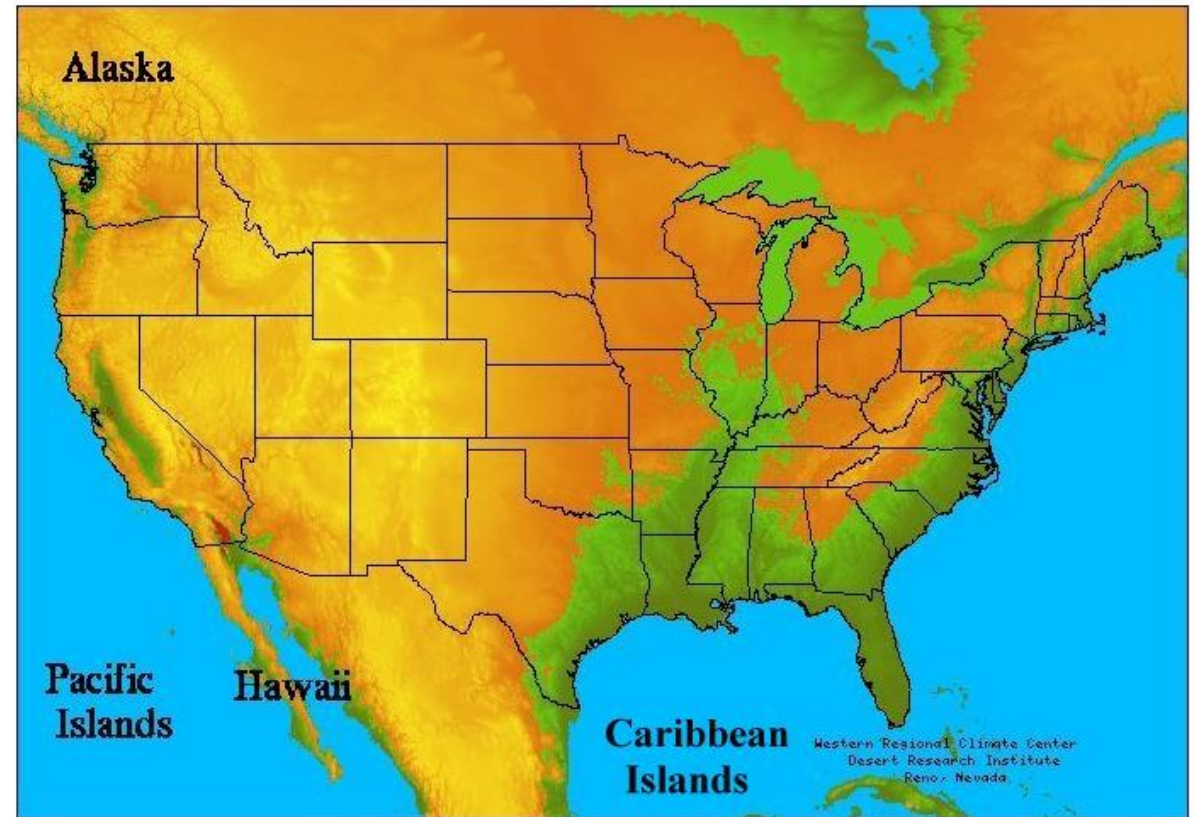


RAWS USA Climate Archive

Station Maps and Data | Summaries | Photos | Documents | Related Links | Specials

Best viewed with 800 X 600 or greater screen resolution.

State Selection Map



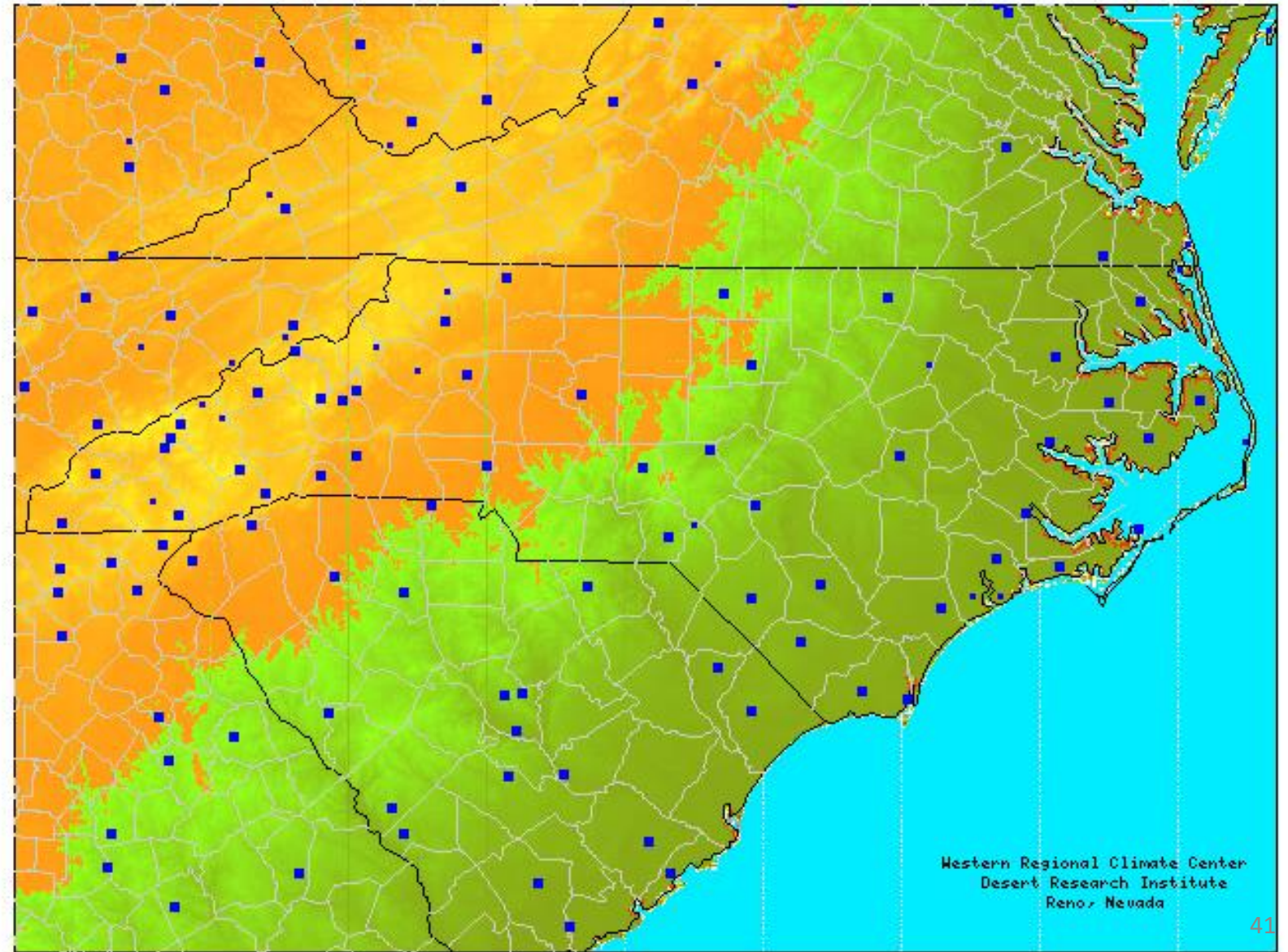
NOTE:

The following pages are still under construction.
Stations and historical data are still being added to the archives.
Several products are also being developed and will be added as they are completed.

RAWS in NC:



[Washington Georgia](#)
[7 Mile Ridge North Carolina](#)
[Alligator River NWR N. Carolina](#)
[Back Island North Carolina](#)
[Beaufort North Carolina](#)
[Busick North Carolina](#)
[Caswell Game Lands N. Carolina](#)
[Cedar Island North Carolina](#)
[Cheoah North Carolina](#)
[Cow Mountain North Carolina](#)
[Croatan North Carolina](#)
[Davidson River North Carolina](#)
[DARE Bomb Range North Carolina](#)
[Drowning Creek North Carolina](#)
[Duke Forest North Carolina](#)
[Elizabeth City North Carolina](#)
[Fairfield North Carolina](#)
[Fort Bragg North Carolina](#)
[Finch's Station North Carolina](#)
[Fire Tower North Carolina](#)
[Greens Cross North Carolina](#)
[Grandfather North Carolina](#)
[Guion Farm North Carolina](#)
[Highlands North Carolina](#)
[Hofmann Forest North Carolina](#)



USDA Southeast Regional Climate Hub


www.climatehubs.usda.gov/hubs/southeast

Storm Prep Commodity Guides

Seasonal Shifts

Drought Info


Links to Other Resources



Climate Hubs
U.S. DEPARTMENT OF AGRICULTURE

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REGIONAL HUBSALL TOPICSALL CLIMATE IMPACTSALL ACTIONS & RESOURCES



Hurricane Preparation and Recovery Guides for North Carolina Producers

North Carolina agriculture generates approximately \$13 billion in sales each year, but in most years agricultural productivity is negatively affected by hurricane damage. North Carolinians are familiar with the devastation and loss of life and property that can accompany a hurricane event as the state experiences, on average, more than one hurricane every three years. The total economic losses from a single hurricane can reach tens of billions of dollars, while agricultural losses can exceed one billion dollars. North Carolina is a major agricultural producer for the United States, but the structures, livestock, and crops are

NLCD Land Cover 2016



Beef Producers Guide	+
Beekeeping Guide	+
Commercial Nursery Guide	+
Corn Producers Guide	+
Cotton Producers Guide	+
Crawfish Producers Guide	+
Dairy Producers Guide	+
Finfish Producers Guide	+
Forage Crop Guide	+
Onion Producers Guide	+
Peanut Producers Guide	+
Pecan Producers Guide	+
Pine Forest Landowners Guide	+
Poultry Producers Guide	+
Soybean Producers Guide	+

Some Weather & Climate Websites

NC Climate Office

<https://climate.ncsu.edu/climateblog/>



US Soil Moisture

<https://cloud.csiss.gmu.edu/Crop-CASMA/>

Climate & Ag in the Southeast

<https://site.extension.uga.edu/climate/>

Southeast Climate Center

<https://secasc.ncsu.edu/category/newsletters/>

Southeast River Forecast Center

<https://www.weather.gov/serfc/>

Earth Winds

<https://earth.nullschool.net/#current/wind/surface/level/orthographic=-82.42,38.34,2937>

Lightning Tracker

https://www.blitzortung.org/en/live_lightning_maps.php

Drought, NIDIS

<https://www.drought.gov/>



North Carolina Forest Service Seedlings

Plant Trees for Tomorrow!

1-888-NC TREES



HEALTHY FORESTS = CLEAN WATER

Use Best Management Practices



got to be
NC
FOREST PRODUCTS



Tom Gerow, Jr.

Email: tom.a.gerow@ncagr.gov

Learn more at www.ncforestservice.gov

The N.C. Forest Service is a division of the N.C. Depart. of Agriculture & Consumer Services
Steve Troxler, Commissioner

